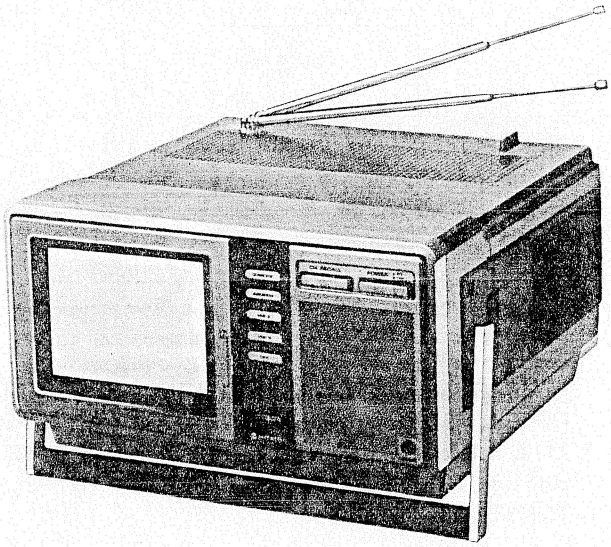
HITACHI

CK-200

SERVICE MANUAL No. 609

NTSC-SYSTEM
GTX Chassis

CAUTION:
Before servicing this chassis, it is important that the service technician read the "Safety Precaution" and "Product Safety Notices" in this Service Manual.



This service manaul shows only essential items.
Our complete service manual including "alignment procedure", "printed wiring boards" and "technical information" are issued by manual No. 615.

CONTENTS

SPECIFICATIONS 1
SAFETY PRECAUTIONS 2
PRODUCT SAFETY NOTICE 3
CONTROLS 3
TECHNICAL CAUTIONS 4
CHASSIS SERVICE INFORMATION 5
DISASSEMBLING P.W. BOARDS 8
LOCATION OF ADJUSTMENT POINT 9
WIRING DIAGRAM 10
PRINTED WIRING BOARD 11
BASIC CIRCUIT DIAGRAM 15
REPLACEMENT PARTS LIST 17

SPECIFICATIONS

ANTENNA INPUT IMPEDANCE	300Ω and 75Ω
TELEVISION R-F FREQUENCY RANGE	
All 12 VHF Channels	54MHz to 88MHz 174MHz to 216MHz
All 70 UHF Channels	470MHz to 890MHz
INTERMEDIATE FREQUENCIES	
Picture I.F Carrier Frequency	45.75MHz
Sound I-F Carrier Frequency	41.25MHz
Sound I-F Frequency	4.5MHz
Color Sub-Carrier Frequency	3.58MHz
POWER INPUT	AC 120V 60Hz, DC 12V
POWER RATING	AC: 29W DC: 15W
CONVERGENCE	Self convergence
FOCUS	Electrostatic
PICTURE TUBE	150AYB22
SOUND OUTPUT	500mW, 400Hz
SPEAKER	7.7cm, 25Ω
TRANSISTORS	30
DIODES	55
IC	5
DIMENSIONS (W)	30.4cm
(H)	16.5cm
(D)	30.8cm
WEIGHT	Appr. 5.3kg

Since this is a basic circuit, the value of the parts and specifications are subject to be altered for improvement.

SOLID STATE COLOR TELEVISION

August 1979

SAFETY PRECAUTIONS

NOTICE: Comply with all cautions and safety related notes located on or inside the cabinet and on the chassis or picture tube.

WARNING: Since the chassis of this receiver is connected to one side of AC power supply during operation, whenever the receiver is plugged in, service should not be attempted by anyone unfamiliar with the precautions necessary when working on this type of receiver.

The following precautions should be observed:

1. Do not install, remove, or handle the picture tube in any manner unless shatterproof goggles are worn. People not so equipped should be kept away while picture tubes are handled. Keep picture tube awya from the body while handling.
2. When replacing a chassis in the receiver, all the protective devices must be put back in place, such as barriers, non-metallic knobs, adjustment and compartment cover-shields, isolation resistor-capacitor, etc.
3. When service is required, observe the original lead dress. Extra precaution should be taken to assure correct lead dress in the high voltage circuitry area.
4. Always use the manufacturer's replacement components. Especially critical components as indicated on the circuit diagram should not be replaced by other manufacturer's. Furthermore where a short circuit has occurred, replace those components that indicate evidence of overheating.
5. Before returning a serviced receiver to the customer, the service technician must thoroughly test the unit to be certain that it is completely safe to operate without danger of electrical shock, and be sure that no protective device built into the receiver by the manufacturer has become defective, or inadvertently defeated during servicing.

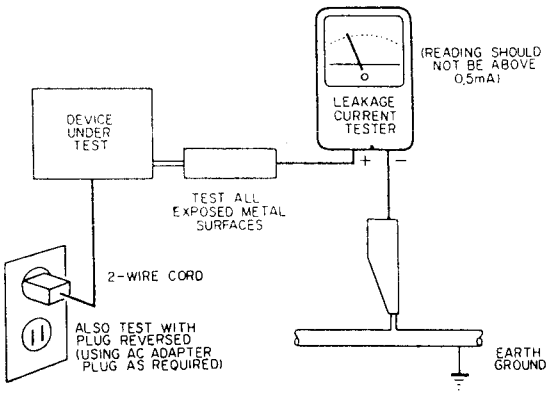
Therefore, the following checks should be performed for the continued protection of the customer and service technician.

Leakage Current Cold Check

With the AC plug removed from the 120V AC 60Hz source, place a jumper across the two plug prongs. Turn the AC power switch on. Using an insulation tester (DC 500V), connect one lead to the jumpered AC plug and touch the other lead to each exposed metal part (antennas, screwheads, metal overlays, control shafts, etc.), particularly any exposed metal part having a return path to the chassis. Exposed metal parts having a return path to the chassis should have a minimum resistor reading of 0.3MΩ and a maximum resistor reading of 5MΩ. Any resistor value below or above this range indicates an abnormality which requires corrective action. Exposed metal parts not having a return path to the chassis will indicate an open circuit.

Leakage Current Hot Check

Plug the AC line cord directly into a 120V AC 60Hz outlet (do not use an isolation transformer for this check). Turn the AC power swtich on. Using a "leakage Current Tester (Simpson Model 229 equivalent)", measure for current from all exposed metal parts of the cabinet (antennas, screwheads, metal overlays, control shaft, etc.), particularly any exposed metal part having a return path to the chassis, to a known earth ground (water pipe, conduit, etc.). Any current measured must not exceed 0.5mA.


(READING SHOULD NOT BE ABOVE 0.5mA)
LEAKAGE CURRENT TESTER
DEVICE UNDER TEST
TEST ALL EXPOSED METAL SURFACES
2-WIRE CORD
ALSO TEST WITH PLUG REVERSED (USING AC ADAPTER PLUG AS REQUIRED)
EARTH GROUND

AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE RECEIVER TO THE CUSTOMER.

High Voltage

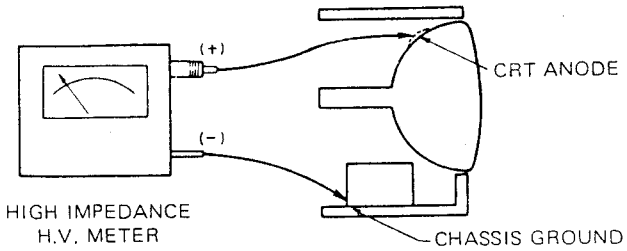
This receiver is provided with a hold down circuit for clearly indicating that voltage has increased in excess of a predetermined value. Comply with all notes described in this Service Manual regarding this hold donw circuit when servicing, so that this hold down circuit may correctly be operated.

Serviceman warning

With minimum Brightness and Contrast, operating high voltage in this receiver is lower than 16.0KV. In case any component having influence on high voltage is replaced, confirm that high voltage with minimum Brightness and Contrast is lower than 16.0KV.

To measure H.V. use a high impedance H.V. meter. Connect (−) to chassis earth and (+) to the CRT anode button. (See the following connection diagram).

NOTE: Turn power switch off without fail before the connection with Anode button is made.



X-radiation

TUBE: The primary source of X radiation in this receiver is the picture tube. The tube utilized for the above mentioned function in this chassis is specially constructed to limit X radiation emissions.

For continued X radiation protection, the replacement tube must be the same type as the original, HITACHI approved type.

When trouble shooting and making test measurements in a receiver with a problem of excessive high voltage, avoid being unnecessarily close to the picture tube and the high voltage component.

Do not operate the chassis longer than is necessary to locate the cause excessive voltage.

PRODUCT SAFETY NOTICE

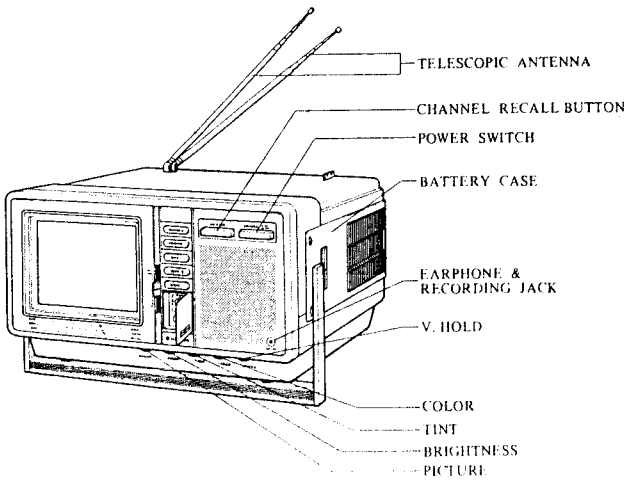
Many electrical and mechanical parts in HITACHI television receiver have special safetyrelated characteristics. These are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

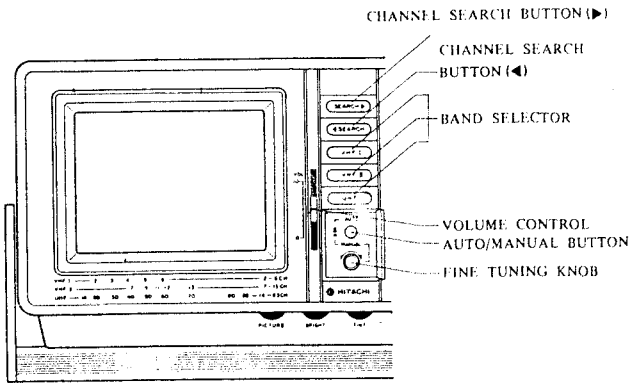
Electrical components having such features are identified by marking with a ⚠ on the schematics and on the parts list in this Service Manual.

The use of a substitute replacement component which does not have the same safety characteristics as the HITACHI recommended replacement one, shown in parts list in this Service Manual, may create shock, fire, X-radiation, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current HITACHI Service Manual. A subscription to, or additional copies of, HITACHI Service Manual may be obtained at a nominal charge from HITACHI SALES CORPORATION.

CONTROLS





TECHNICAL CAUTIONS

[CHECK OF HIGH VOLTAGE HOLD DOWN CIRCUIT]

Step 1: Set the AC Input voltage to 132±3V.

Step 2: Connect Equipment and H.V. meter as shown in Fig. 1 and Fig. 2.
(Be sure that the control knob of Equipment is rotated fully counterclockwise.)

Step 3: Turn the receiver on, (receive color-bar or white-pattern) and rotate BRIGHTNESS COLOR AND PICTURE VR TO MAXIMUM.

Step 4: Slowly rotate the control knob of Equipment clockwise and confirm that picture on the screen disappears at the indication of H.V. meter less than 17.5KV.

Step 5: Turn the receiver off, and disconnect Equipment and H.V. meter.

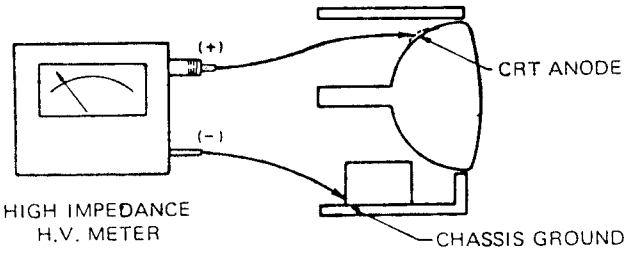


Fig. 2 CONNECTION OF H.V. METER

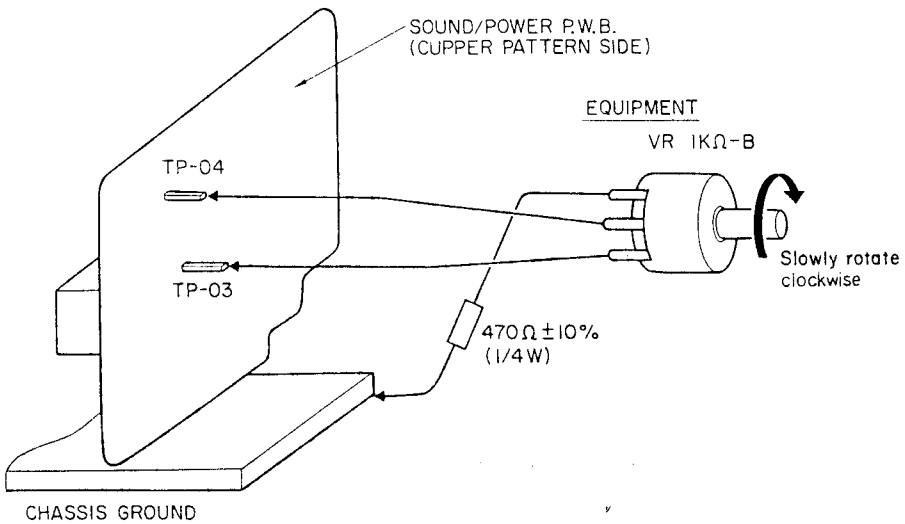
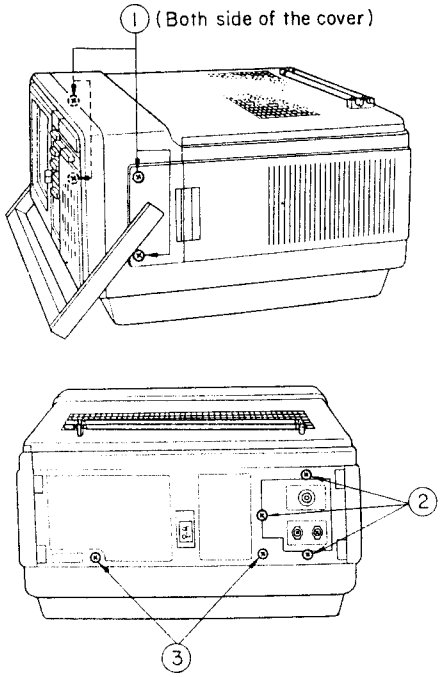


Fig. 1 CONNECTION OF EQUIPMENT

CHASSIS SERVICE INFORMATION

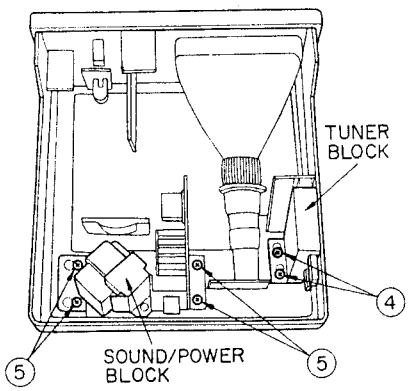
UPPERCOVER REMOVAL

(1) Disconnect the UHF and VHF antenna cord from antenna terminal.
(2) Remove four screws (1) at the both side of uppercover.
(3) Remove three screws (2) of the antenna terminal board.
(4) Remove two screws (3) at the topcover and then lift up the uppercover.



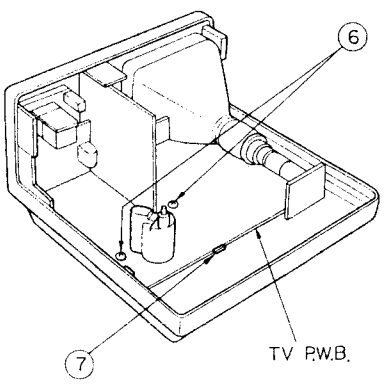
TUNER AND SOUND/ POWER BLOCK REMOVAL

(1) Remove two screws (4) for retaining the tuner block to the cabinet.
(2) Remove four screws (5) for retaining the sound/power block to the cabinet.



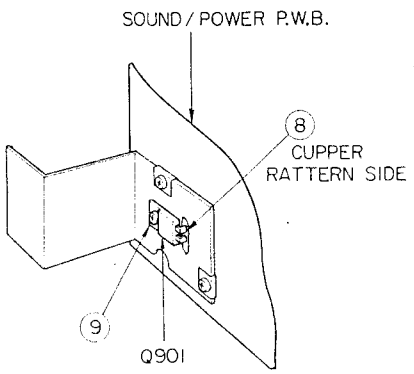
T.V P.W. BOARD REMOVAL

(1) Remove two screws (6) for retaining the T.V P.W. Board to the cabinet.
(2) Unlock the T.V P.W. Board (7).



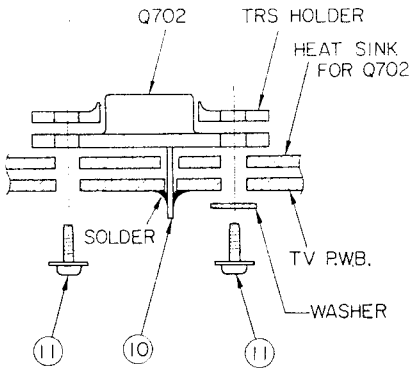
POWER REGULATOR TRANSISTOR (Q901) REMOVAL

(1) Unsolder each leads (8) (emitter and base of Q901).
(2) Remove a screw (9) for retaining the collector of Q901.



HORIZONTAL OUTPUT TRANSISTOR REMOVAL

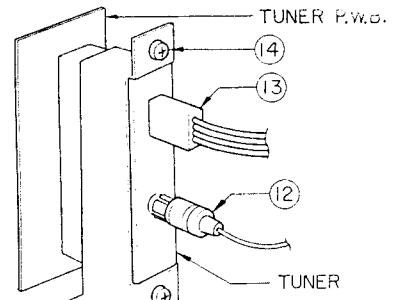
(1) Unsolder each lead (10) (emitter and base of Q901).
(2) Remove two screws (11) for retaining Q702 and its holder.
When re-assembling Q702, procedure shall be followed as shown in Figure.

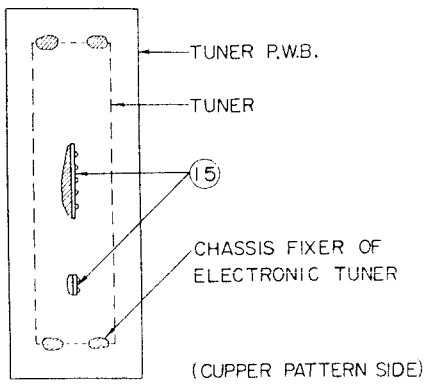


TUNER REMOVAL

(1) Unsolder the phono-plug (12) of RF coaxial cable from antenna terminal board of the electronic tuner.
(2) Disconnect UHF feeder connector (13) from antenna terminal board.
(3) Loosen two screws (14) for retaining the tuner to chasssi of tuner.
(4) Unsolder terminal board (15) and chassis fixer of electronic tuner at the tuner P.W.B. (Cupper pattern side).

NOTE: When unsoldering. The chassis FIXER of electronic tuner shall be straightened out.





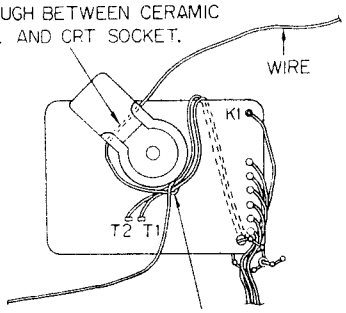
DISASSEMBLING CRT MODULE

(1) Rewind the pate (1).
(2) Untie the wire for fixing CRT module.
(3) Pull out CRT module from CRT-BASE. When returning CRT module, procedure shall be followed as shown in Figure.

PROCEDURE OF CRT MODULE MOUNTING

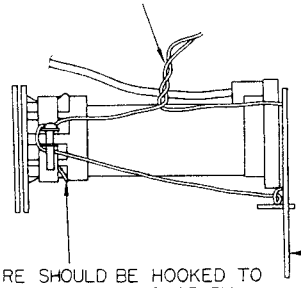
(1) Add the wire to the CRT module as shown in Fig.
(2) Mount the CRT module to CRT after tacking DY to original position on CRT neck.
(3) CRT module should be fixed in accordance with the procedure of following ((2)~(4)).
(4) Check the CRT module should be fixed completely to the CRT neck.

(1) WIRE SHOULD BE PASSED THROUGH BETWEEN CERAMIC P.W.B. AND CRT SOCKET.

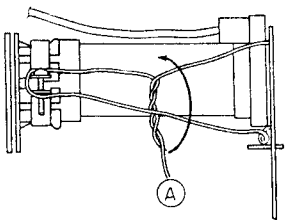


WIND THE WIRE ONCE TO LEADS OF T1 AND T2.

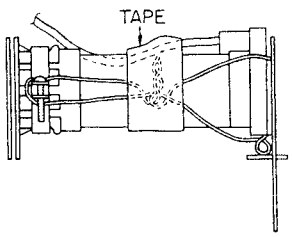
(2) WIRE SHOULD BE TWISTED 3 OR 4 TIHES SO THAT IT DOSE NOT LOOSEN.



(3) WIRE SHOULD BE HOOKED TO SCREW FOR FIXING OF DY.

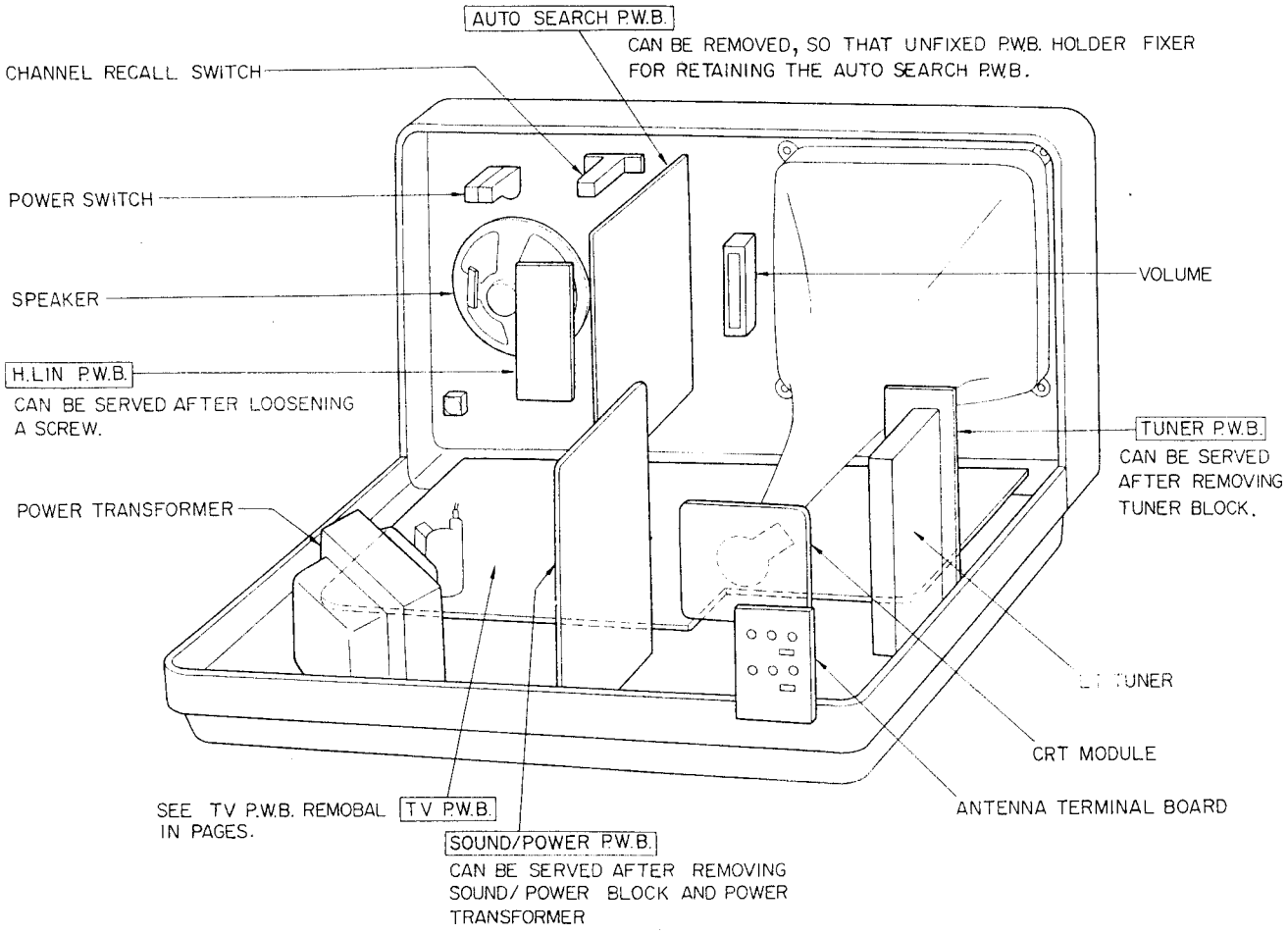


(4) "A" PART OF WIRE SHOULD BE LIFTED UP TO DIRECTION OF ARROW.

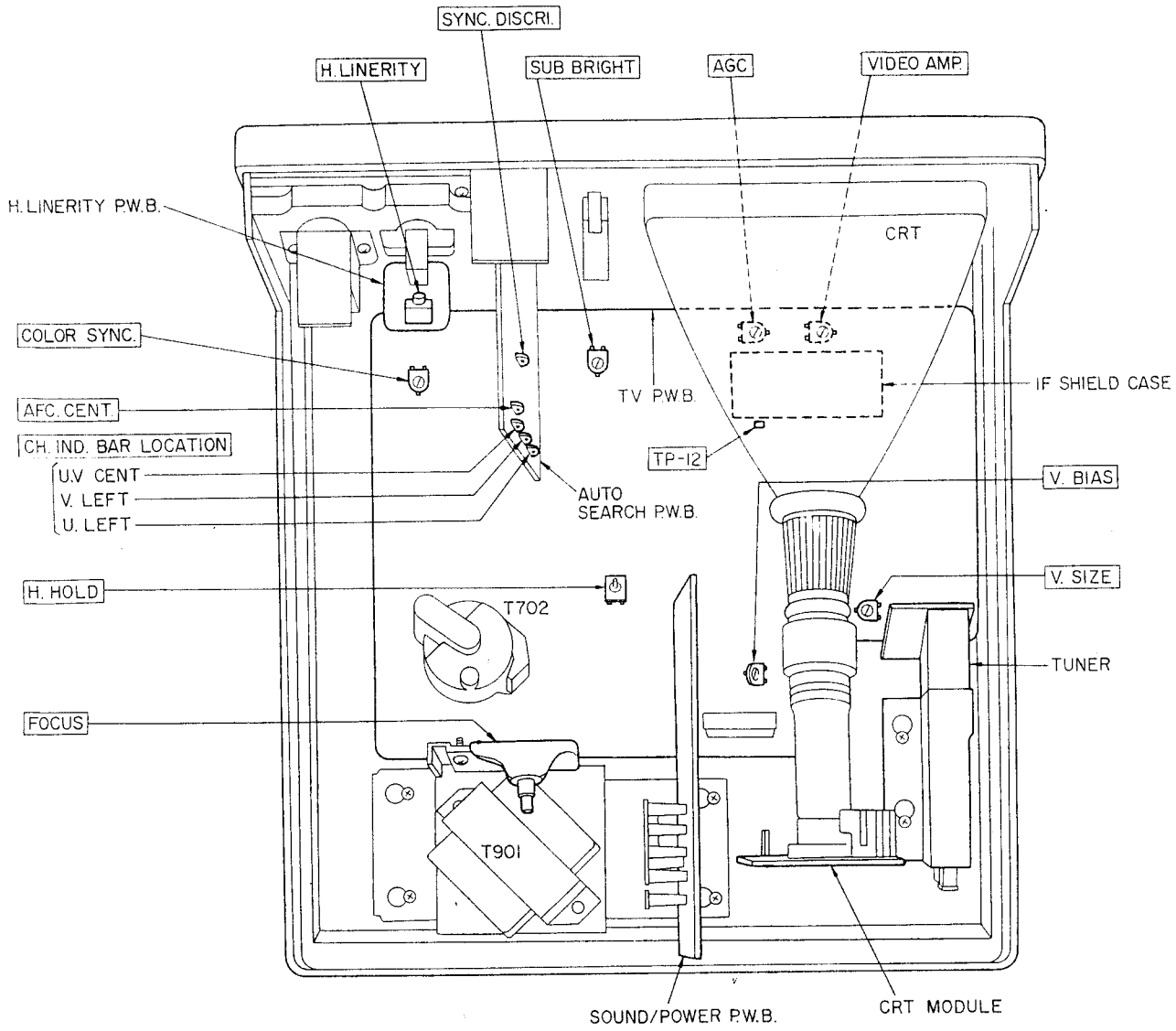


WIND THE TAPE 2 TIMES TO THE CRT NECK AFTER TAPING TO FOCUS LEAD ONCE.

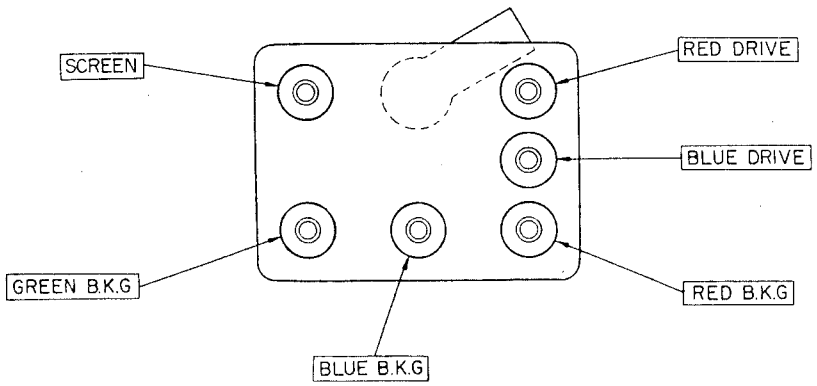
DISASSEMBLING P.W. BOARDS


AUTO SEARCH P.W.B.
CAN BE REMOVED, SO THAT UNFIXED P.W.B. HOLDER FIXER FOR RETAINING THE AUTO SEARCH P.W.B.
CHANNEL RECALL SWITCH
POWER SWITCH
SPEAKER
VOLUME
H.LIN P.W.B.
CAN BE SERVED AFTER LOOSENING A SCREW.
TUNER P.W.B.
CAN BE SERVED AFTER REMOVING TUNER BLOCK.
POWER TRANSFORMER
CRT MODULE
ANTENNA TERMINAL BOARD
SEE TV P.W.B. REMOBAL IN PAGES.
TV P.W.B.
SOUND/POWER P.W.B.
CAN BE SERVED AFTER REMOVING SOUND/ POWER BLOCK AND POWER TRANSFORMER

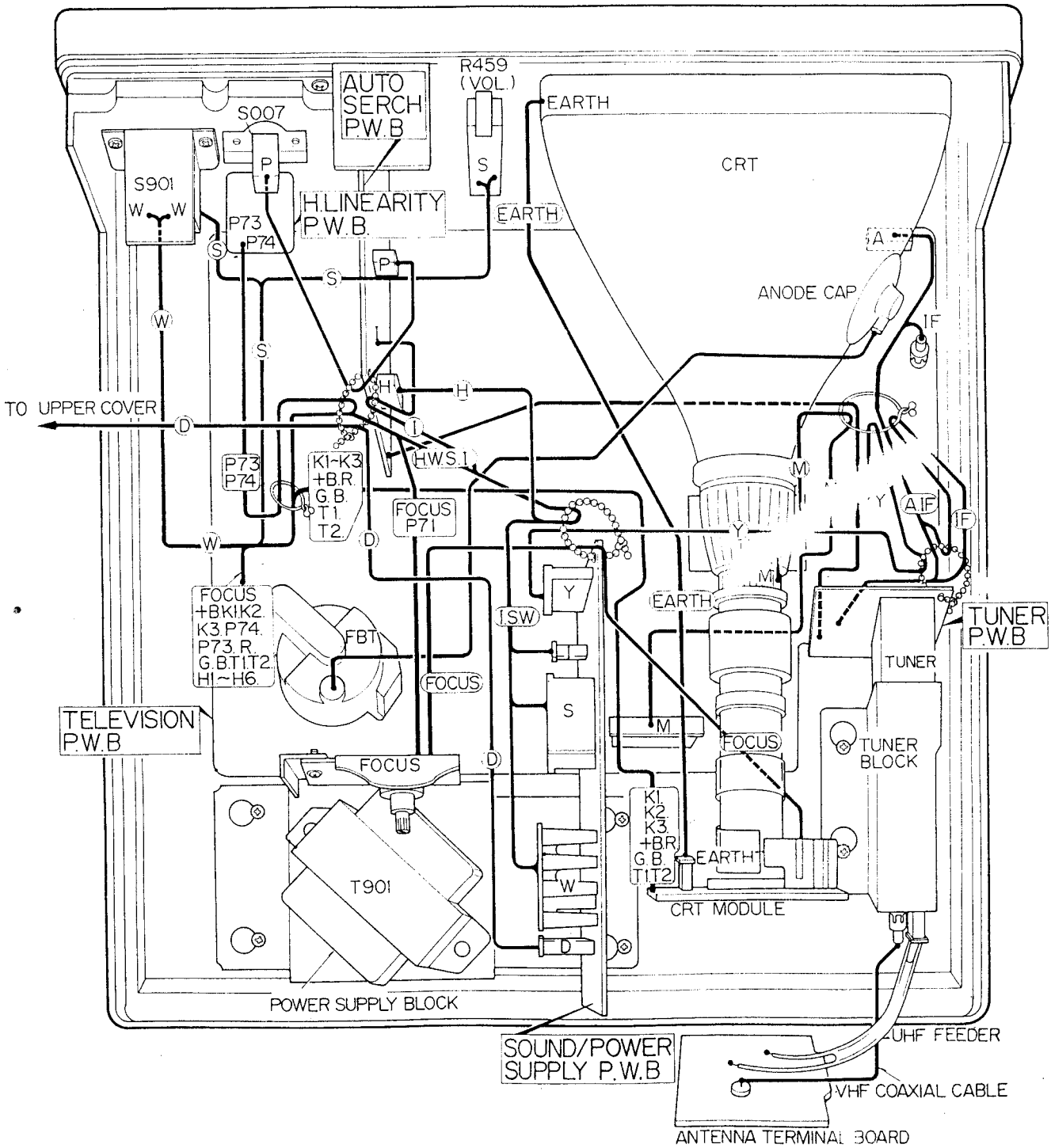
LOCATION OF ADJUSTMENT POINT



CRT MODULE (BACK VIEW)



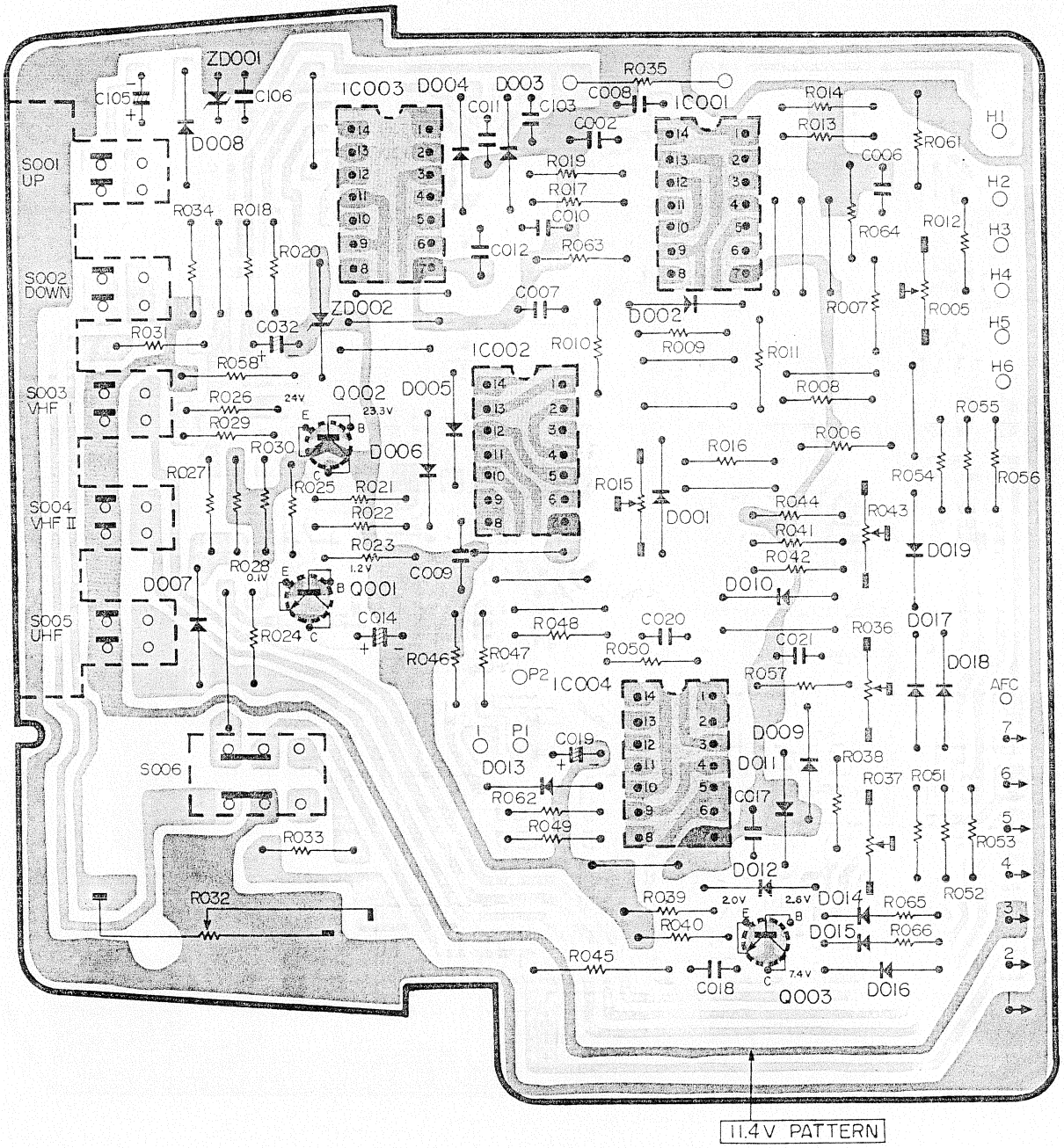
WIRING DIAGRAM



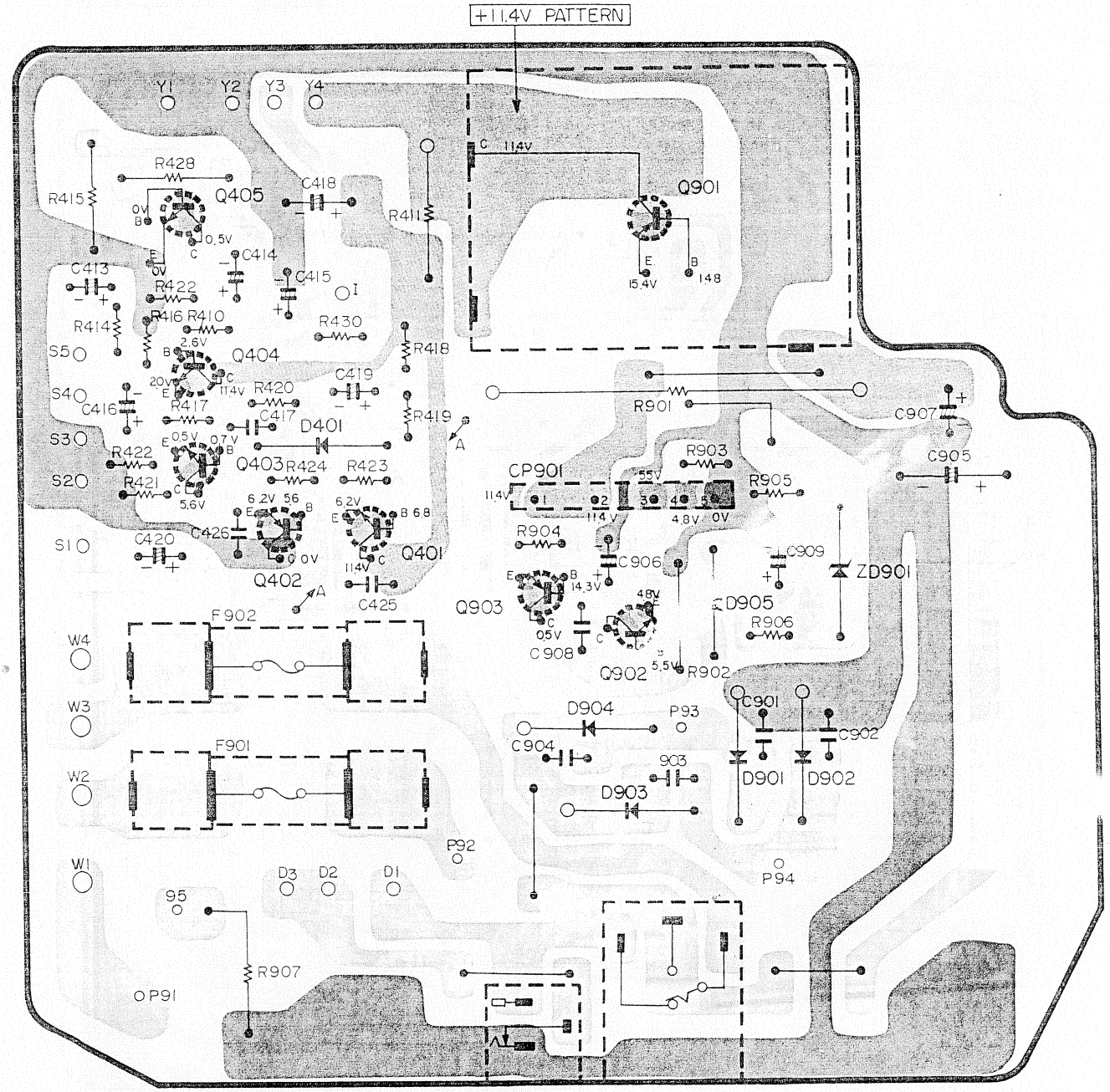
PRINTED WIRING BOARD

..... +B PATTERN
..... SIGNAL PATTERN
..... GROUND PATTERN

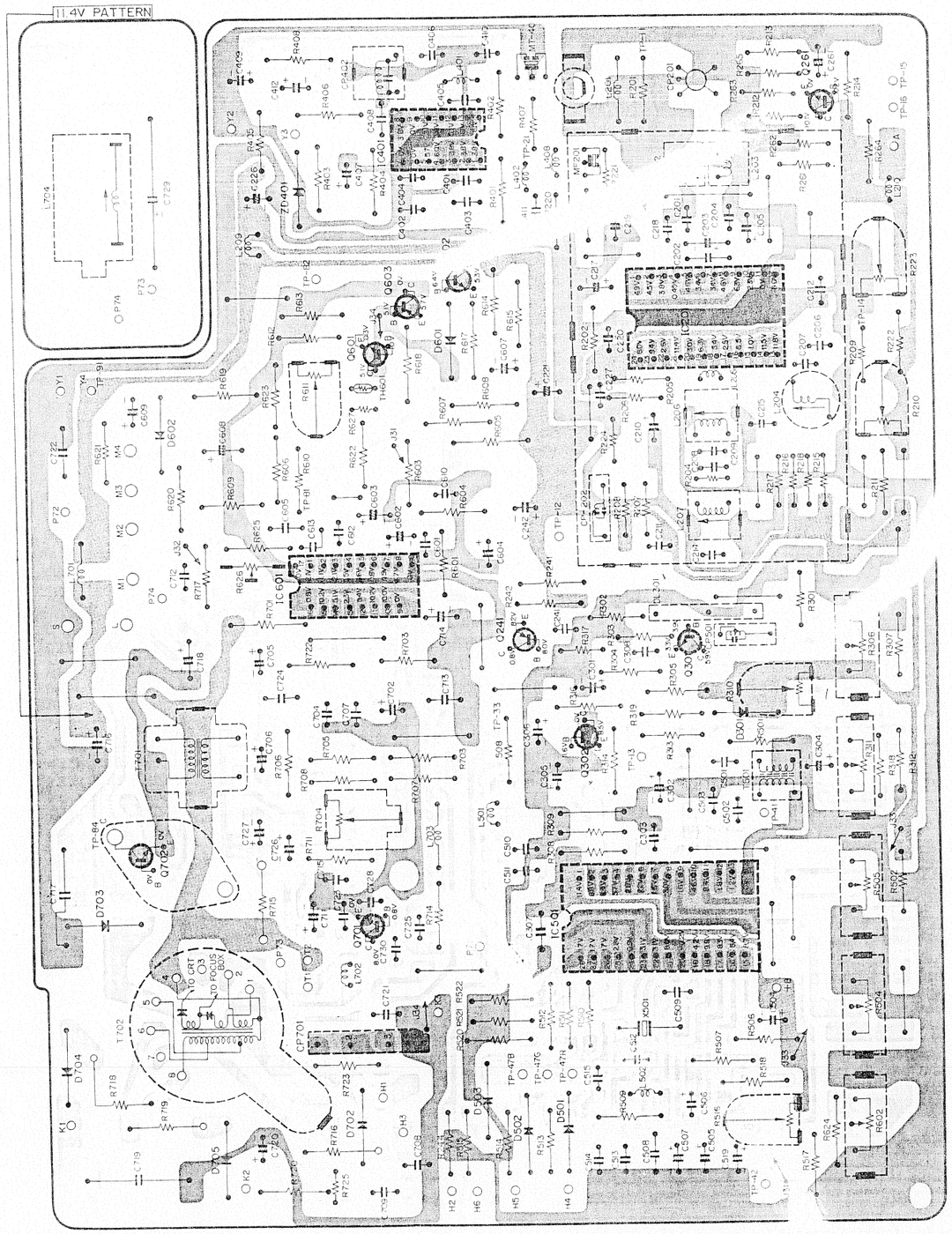
1. AUTO SEARCH P.W. BOARD



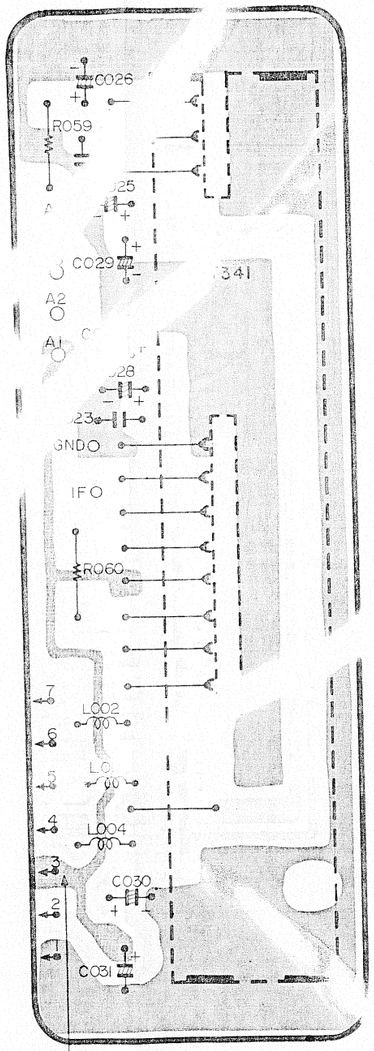
2. SOUND/POWER SUPPLY P.W. BOARD



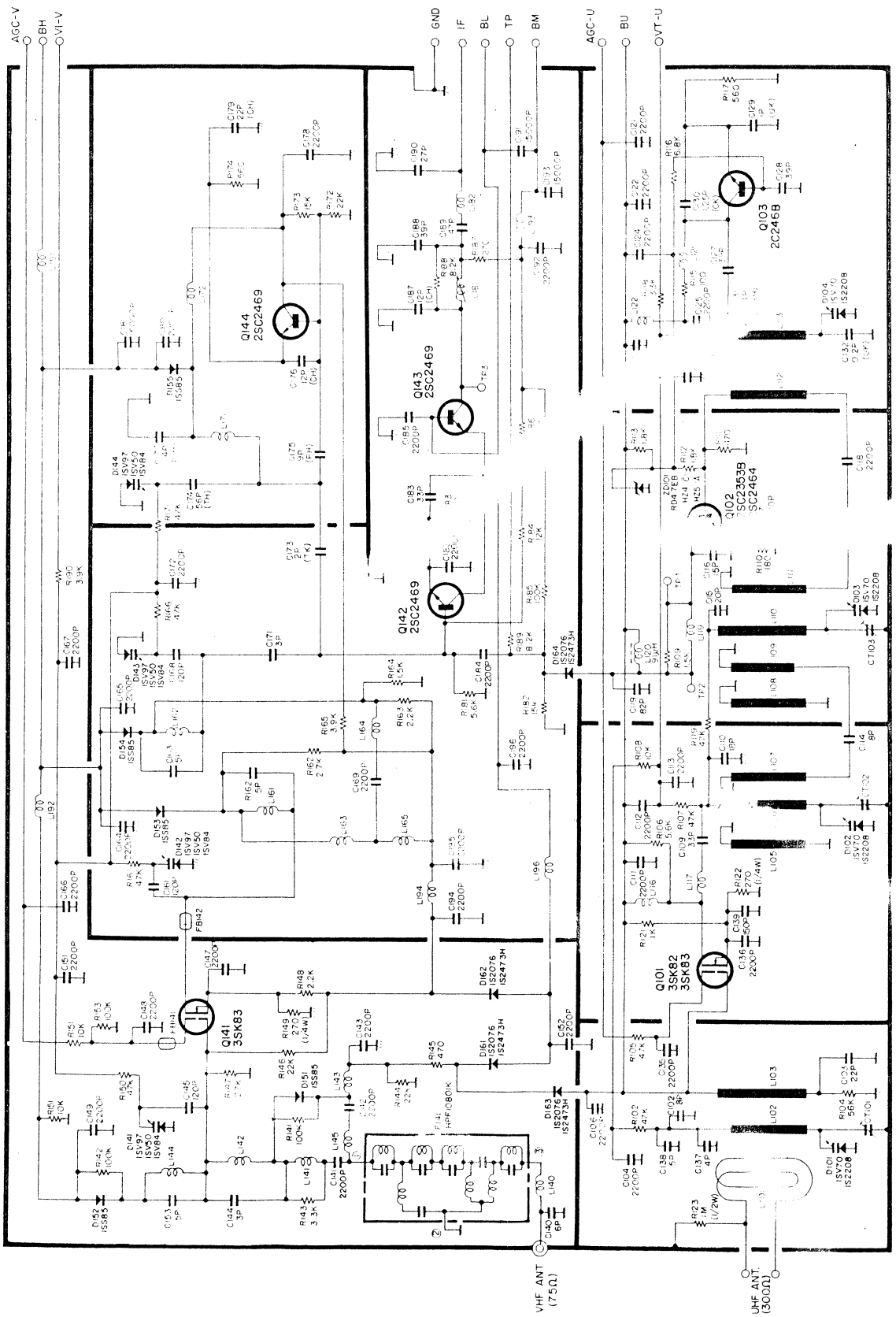
3. T.V P.W. BOARD



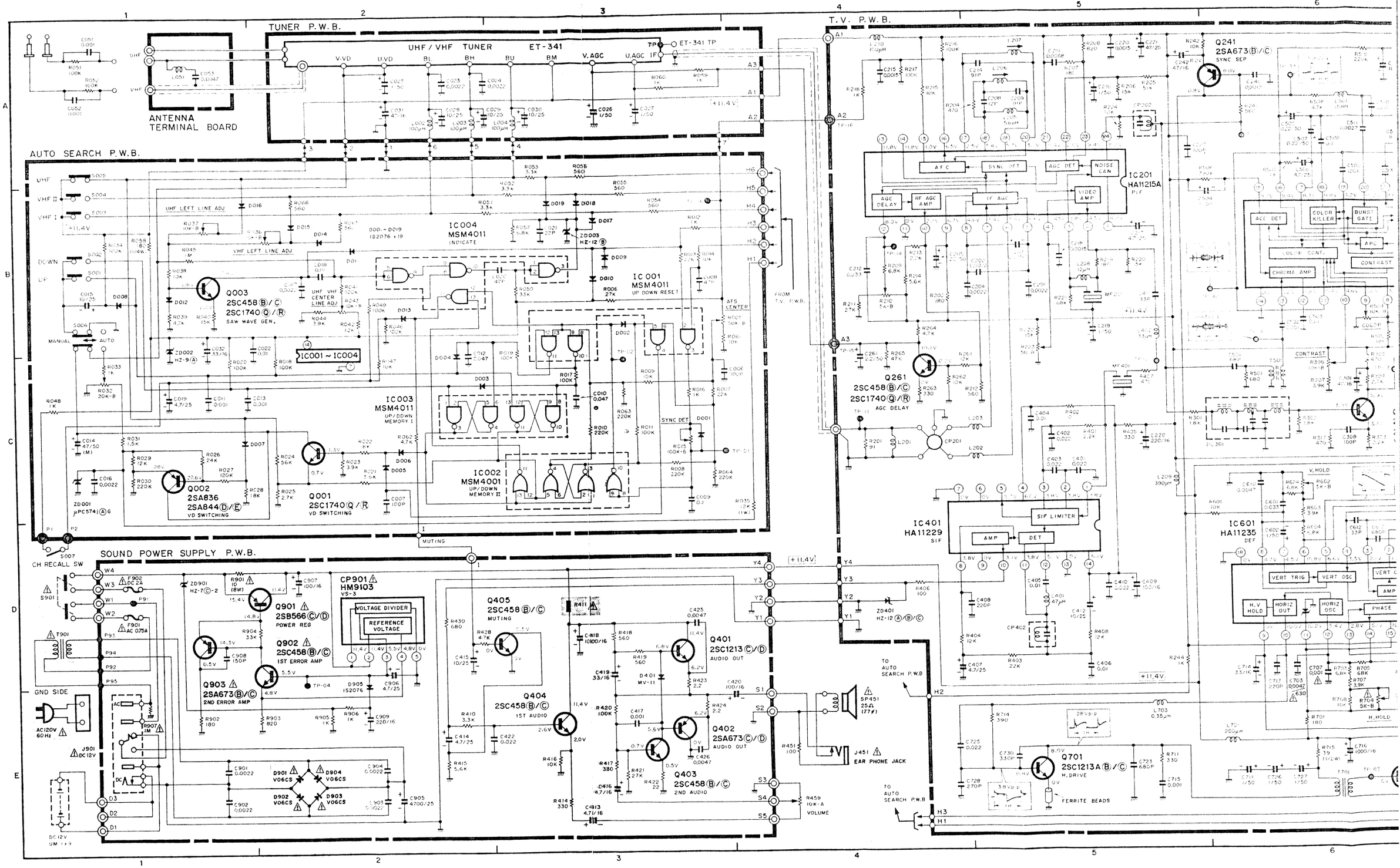
4. TUNER P.W. BOARD



UHF/VHF TUNER CIRCUIT DIAGRAM (ET-341)

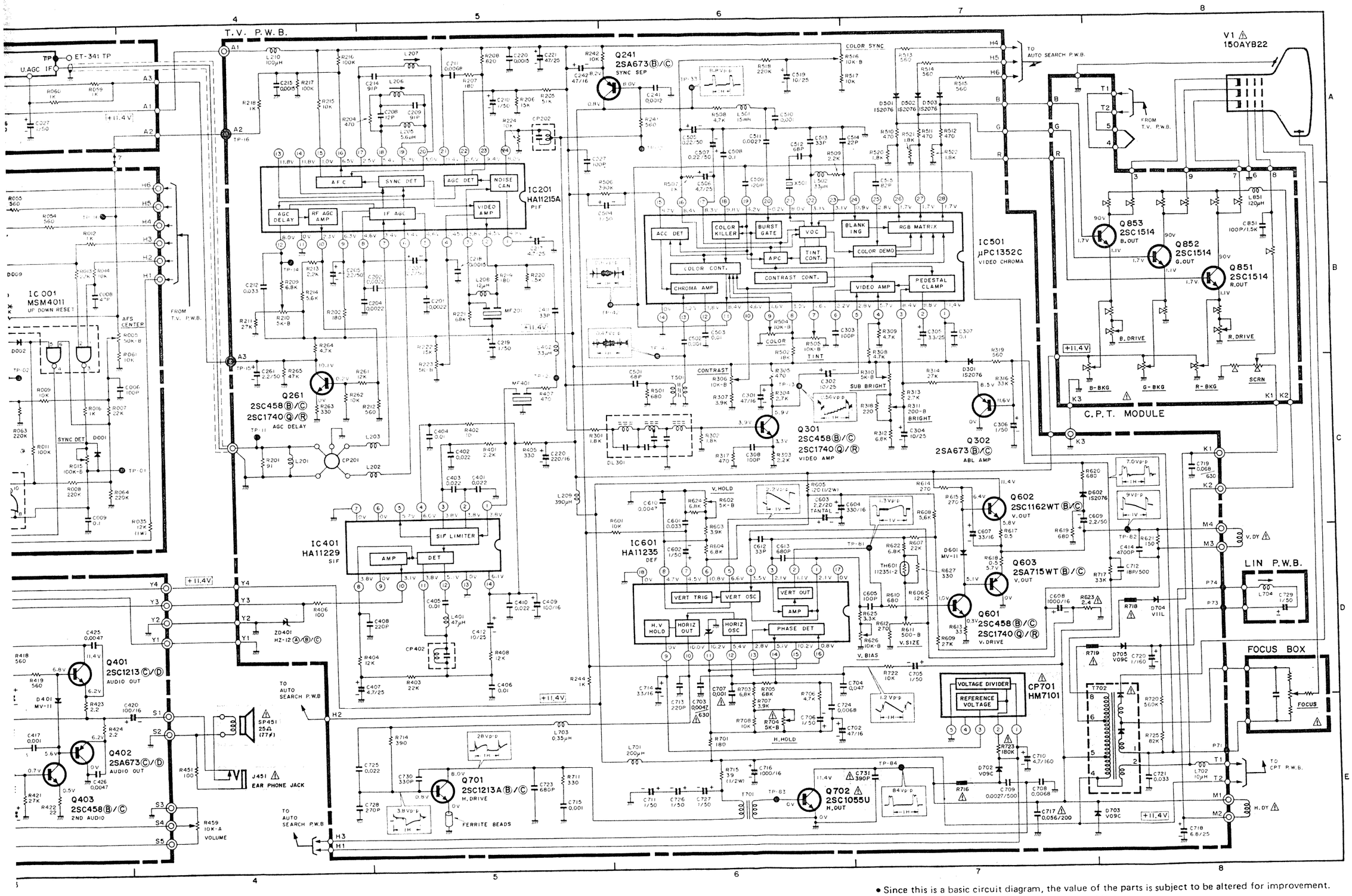


BASIC CIRCUIT DIAGRAM (CK-200)



BASIC CIRCUIT DIAGRAM (CK-200)

PRODUCT SAFETY NOTE: Components marked with a ⚠ and shaded have special characteristics important to safety. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver though improper servicing.



- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.
- All DC voltage to be measured with a tester (100kΩ/V).
  Voltage taken on a complex color bar sgnal including a standard color bar signal.

REPLACEMENT PARTS LIST

PRODUCT SAFETY NOTE: Components marked with a ⚠ have special characteristics important to safety. Before replacing any of these components, read carefully, the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

SYMBOL NO.	PARTS NO.	DESCRIPTION		
CAPACITORS				
C006	0248684	Ceramic	100pF ±5%	DC50WV
C007	0248684	Ceramic	100pF ±5%	DC50WV
C008	0248676	Ceramic	47pF ±5%	DC50WV
C009	0277025	Polyester film	0.1μF ±10%	DC50WV
C010	0277021	Polyester film	0.047μF ±10%	DC50WV
C011	0244101	Ceramic	1000pF ±10%	DC50WV
C012	0277021	Polyester film	0.047μF ±10%	DC50WV
C013	0244101	Ceramic	1000pF ±10%	DC50WV
C014	0259902	Electrolytic	47μF	DC50WV
C015	0252621	Electrolytic	10μF	DC25WV
C016	0244105	Ceramic	0.0022μF±10%	DC50WV
C017	0277005	Polyester film	0.0022μF±10%	DC50WV
C018	0277013	Polyester film	0.01μF ±10%	DC50WV
C019	0252615	Electrolytic	4.7μF	DC25WV
C020	0248676	Ceramic	47pF	DC50WV
C021	0248668	Ceramic	25pF ±5%	DC50WV
C022	0277013	Polyester film	0.01μF ±10%	DC50WV
C023	0244105	Ceramic	0.0022μF±10%	DC50WV
C024	0244105	Ceramic	0.0022μF±10%	DC50WV
C025	0252811	Electrolytic	1μF	DC50WV
C026	0252811	Electrolytic	1μF	DC50WV
C027	0252811	Electrolytic	1μF	DC50WV
C028	0252621	Electrolytic	10μF	DC25WV
C029	0252621	Electrolytic	10μF	DC25WV
C030	0252621	Electrolytic	10μF	DC25WV
C031	0252525	Electrolytic	47μF	DC16WV
C032	0252523	Electrolytic	30μF	DC15WV
C201	0244105	Ceramic	0.0022μF±10%	DC50WV
C202	0244105	Ceramic	0.0022μF±10%	DC50WV
C203	0252817	Electrolytic	2.2μF	DC50WV
C204	0244105	Ceramic	0.0022μF±10%	DC50WV
C205	0252817	Electrolytic	2.2μF	DC50WV
C208	0246442	Ceramic	12pF ±5%	DC50WV
C209	0246463	Ceramic	91pF ±5%	DC50WV
C210	0252811	Electrolytic	1μF	DC50WV
C211	0277011	Polyester film	0.01μF ±10%	DC50WV
C212	0277019	Polyester film	0.033μF ±10%	DC50WV
C214	0246463	Ceramic	91pF ±5%	DC50WV
C215	0244103	Ceramic	0.0015μF±10%	DC50WV
C217	0252615	Electrolytic	4.7μF	DC25WV
C218	0244103	Ceramic	0.0015μF±10%	DC50WV
C219	0252811	Electrolytic	1μF	DC50WV
C220	0244103	Ceramic	0.0015μF±10%	DC50WV
C221	0252525	Electrolytic	47μF	DC16WV
C226	0252532	Electrolytic	200μF	DC15WV
C227	0248684	Ceramic	100pF ±5%	DC50WV
C241	0244102	Ceramic	0.0012μF±10%	DC50WV
C242	0252525	Electrolytic	47μF	DC16WV
C261	0252817	Electrolytic	2.2μF	DC50WV
C301	0252525	Electrolytic	47μF	DC16WV
C302	0252621	Electrolytic	10μF	DC25WV
C303	0248684	Ceramic	100pF ±5%	DC50WV
C304	0252621	Electrolytic	10μF	DC25WV
C305	0252613	Electrolytic	3.3μF	DC25WV
C306	0252811	Electrolytic	1μF	DC50WV
C307	0277025	Polyester film	0.1μF ±10%	DC50WV
C308	0248684	Ceramic	100pF ±5%	DC50WV
C401	0244173	Ceramic	0.02μF $^{+100}_{0}$%	DC50WV
C402	0244173	Ceramic	0.02μF $^{+100}_{0}$%	DC50WV
C403	0244173	Ceramic	0.02μF $^{+100}_{0}$%	DC50WV
C404	0244171	Ceramic	0.01μF $^{+100}_{0}$%	DC50WV
C405	0244171	Ceramic	0.01μF $^{+100}_{0}$%	DC50WV
C406	0244171	Ceramic	0.01μF $^{+100}_{0}$%	DC50WV
C407	0252615	Electrolytic	4.7μF	DC25WV
C408	0248732	Ceramic	220pF ±10%	DC50WV
C409	0252531	Electrolytic	100μF	DC15WV
C410	0244173	Ceramic	0.02μF $^{+100}_{0}$%	DC50WV
C411	0248672	Ceramic	33pF ±5%	DC50WV
C412	0252621	Electrolytic	10μF	DC25WV
C413	0252615	Electrolytic	4.7μF	DC25WV
C414	0252615	Electrolytic	4.7μF	DC25WV
C415	0252621	Electrolytic	10μF	DC25WV
C416	0252615	Electrolytic	4.7μF	DC25WV
C417	0244105	Ceramic	0.0022μF±10%	DC50WV
C418	0252536	Electrolytic	1000μF	DC16WV
C419	0252523	Electrolytic	30μF	DC15WV
C420	0252531	Electrolytic	100μF	DC15WV
C422	0277009	Polyester film	0.0047μF±10%	DC50WV
C425	0244109	Ceramic	0.0047μF±10%	DC50WV
C426	0244109	Ceramic	0.0047μF±10%	DC50WV
C501	0248680	Ceramic	68pF ±5%	DC50WV
C502	0244101	Ceramic	1000pF ±10%	DC50WV
C503	0244171	Ceramic	0.01μF $^{+100}_{0}$%	DC50WV
C504	0252811	Electrolytic	1μF	DC50WV
C505	0252806	Electrolytic	0.022μF	DC50WV
C506	0252615	Electrolytic	4.7μF	DC25WV
C507	0252806	Electrolytic	0.02μF	DC50WV
C508	0277025	Polyester film	0.1μF ±10%	DC50WV
C509	0248686	Ceramic	120pF ±5%	DC50WV
C510	0244101	Ceramic	1000pF ±10%	DC50WV
C511	0244106	Ceramic	0.0027μF±10%	DC50WV
C512	0246460	Ceramic	68pF ±5%	DC50WV
C513	0246452	Ceramic	33pF ±5%	DC50WV
C514	0246448	Ceramic	22pF ±5%	DC50WV
C515	0248682	Ceramic	82pF ±5%	DC50WV
C519	0252621	Electrolytic	10μF	DC25WV
C601	0277019	Polyester film	0.033μF ±10%	DC50WV
C602	0252811	Electrolytic	1μF	DC50WV
C603	0292710	Tantal	2.2μF	DC20WV
C604	0252563	Electrolytic	330μF	DC16WV
C605	0248724	Ceramic	100pF ±10%	DC50WV
C607	0252523	Electrolytic	30μF	DC15WV
C608	0252536	Electrolytic	1000μF	DC16WV
C609	0252817	Electrolytic	2.2μF	DC50WV
C610	0244109	Ceramic	0.0047μF±10%	DC50WV
C612	0248672	Ceramic	33pF ±5%	DC50WV
C613	0244117	Ceramic	680pF ±10%	DC50WV
C614	0244109	Ceramic	0.0047μF±10%	DC50WV
C702	0252525	Electrolytic	47μF	DC16WV
⚠ C703	0299977	Polypropylene	0.0047μF±10%	DC630WV
C704	0277021	Polyester film	0.047μF ±10%	DC50WV
C705	0252811	Electrolytic	1μF	DC50WV
C706	0252811	Electrolytic	1μF	DC50WV
⚠ C707	0276811	Polyester film	1000pF	DC50WV
C708	0277011	Polyester film	0.01μF ±10%	DC50WV
C709	0244506	Ceramic	2700pF ±10%	DC500WV
C710	0257537	Electrolytic	4.7μF	DC160WV
C711	0252811	Electrolytic	1μF	DC50WV

PRODUCT SAFETY NOTE: Components marked with a ⚠ have special characteristics important to safety. Before replacing any of these components, read carefully, the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

SYMBOL NO.	PARTS NO.	DESCRIPTION			
C712	0247836	Ceramic	18pF	±5%	DC500WV
C713	0248732	Ceramic	220pF	±10%	DC50WV
C714	0252523	Electrolytic	30μF		DC15WV
C715	0244101	Ceramic	1000pF	±10%	DC50WV
C716	0252536	Electrolytic	1000μF		DC16WV
⚠ C717	0299923	Electrolytic	0.056μF	±10%	DC200WV
C718	0252652	Electrolytic	6.8μF		DC25WV
C719	0299702	Polypropylene	0.068μF	±10%	DC630WV
C720	0257535	Electrolytic	1μF		DC160WV
C721	0277019	Polyester film	0.033μF	±10%	DC50WV
C723	0244117	Ceramic	680pF	±10%	DC50WV
C724	0244111	Ceramic	0.0068μF	±10%	DC50WV
C725	0277017	Polyester film	0.022μF	±10%	DC50WV
C726	0252811	Electrolytic	1μF		DC50WV
C727	0252811	Electrolytic	1μF		DC50WV
C728	0244136	Ceramic	270pF	±10%	DC50WV
C729	0257051	Electrolytic	1μF		DC50WV
C730	0244113	Ceramic	330pF	±10%	DC50WV
C901	0244563	Ceramic	2200pF	$^{+100}_{0}$%	DC500WV
C902	0244563	Ceramic	2200pF	$^{+100}_{0}$%	DC500WV
C903	0244563	Ceramic	2200pF	$^{+100}_{0}$%	DC500WV
C904	0244563	Ceramic	2200pF	$^{+100}_{0}$%	DC500WV
C905	0259835	Electrolytic	4700μF		DC25WV
C906	0252615	Electrolytic	4.7μF		DC25WV
C907	0252531	Electrolytic	100μF		DC15WV
C908	0244119	Ceramic	390pF	±10%	DC50WV
C909	0252532	Electrolytic	200μF		DC15WV

RESISTORS

R005	0151257	Control	50KΩ-B		AFC CENTER
R006	0100099	Carbon film	27KΩ	±5%	SRD1/8P
R007	0100097	Carbon film	22KΩ	±5%	SRD1/8P
R008	0100121	Carbon film	220KΩ	±5%	SRD1/8P
R009	0100089	Carbon film	10KΩ	±5%	SRD1/8P
R010	0100121	Carbon film	220KΩ	±5%	SRD1/8P
R011	0100113	Carbon film	47Ω	±5%	SRD1/8P
R012	0100065	Carbon film	1KΩ	±5%	SRD1/8P
R013	0100097	Carbon film	22KΩ	±5%	SRD1/8P
R014	0100089	Carbon film	10KΩ	±5%	SRD1/8P
R015	0151258	Control	100KΩ-B		SYNC. DET.
R016	0100065	Carbon film	1KΩ	±5%	SRD1/8P
R017	0100113	Carbon film	47Ω	±5%	SRD1/8P
R018	0100113	Carbon film	47Ω	±5%	SRD1/8P
R019	0100113	Carbon film	47Ω	±5%	SRD1/8P
R020	0100113	Carbon film	47Ω	±5%	SRD1/8P
R021	0100083	Carbon film	5.6KΩ	±5%	SRD1/8P
R022	0100095	Carbon film	18KΩ	±5%	SRD1/8P
R023	0100079	Carbon film	3.9KΩ	±5%	SRD1/8P
R024	0100107	Carbon film	56KΩ	±5%	SRD1/8P
R025	0100075	Carbon film	2.7KΩ	±5%	SRD1/8P
R026	0100098	Carbon film	24KΩ	±5%	SRD1/8P
R027	0100115	Carbon film	12KΩ	±5%	SRD1/8P
R028	0100095	Carbon film	18KΩ	±5%	SRD1/8P
R029	0100091	Carbon film	12KΩ	±5%	SRD1/8P
R030	0100121	Carbon film	220KΩ	±5%	SRD1/8P
R031	0100069	Carbon film	1.5KΩ	±5%	SRD1/8P
R032	0151655	Control	20KΩ-B		

SYMBOL NO.	PARTS NO.	DESCRIPTION			
R033	0100065	Carbon film	1KΩ	±5%	SRD1/8P
R034	0100113	Carbon film	47Ω	±5%	SRD1/8P
R035	0110171	Metal oxide film	12KΩ	±5%	RD1PB
R036	0151328	Control	10KΩ-B		VHF LINE ADJ.
R037	0151328	Control	10KΩ-B		UHF LINE ADJ.
R038	0100089	Carbon film	10KΩ	±5%	SRD1/8P
R039	0100081	Carbon film	4.7KΩ	±5%	SRD1/8P
R040	0100093	Carbon film	15KΩ	±5%	SRD1/8P
R041	0100113	Carbon film	47Ω	±5%	SRD1/8P
R042	0100091	Carbon film	12KΩ	±5%	SRD1/8P
R043	0151328	Control	10KΩ-B		LINE CENTER
R044	0100079	Carbon film	3.9KΩ	±5%	SRD1/8P
R045	0179536	Metallized glage	1MΩ	±5%	RK¼P
R046	0100113	Carbon film	47Ω	±5%	SRD1/8P
R047	0100089	Carbon film	10KΩ	±5%	SRD1/8P
R048	0100065	Carbon film	1KΩ	±5%	SRD1/8P
R049	0100113	Carbon film	47Ω	±5%	SRD1/8P
R050	0100101	Carbon film	33KΩ	±5%	SRD1/8P
R051	0100077	Carbon film	3.3KΩ	±5%	SRD1/8P
R052	0100077	Carbon film	3.3KΩ	±5%	SRD1/8P
R053	0100077	Carbon film	3.3KΩ	±5%	SRD1/8P
R054	0100059	Carbon film	560Ω	±5%	SRD1/8P
R055	0100059	Carbon film	560Ω	±5%	SRD1/8P
R056	0100059	Carbon film	560Ω	±5%	SRD1/8P
R057	0100085	Carbon film	680Ω	±5%	SRD1/8P
R058	0114137	Carbon film	180Ω	±5%	SRD¼P
R059	0100065	Carbon film	1KΩ	±5%	
R060	0100065	Carbon film			
R061	0100089	Carbon film	10KΩ	±5%	SRD1/8P
R062	0100081	Carbon film	4.7KΩ	±5%	SRD1/8P
R063	0100121	Carbon film	220KΩ	±5%	SRD1/8P
R064	0100121	Carbon film	220KΩ	±5%	SRD1/8P
R065	0100059	Carbon film	560Ω	±5%	SRD1/8P
R066	0100059	Carbon film	560Ω	±5%	SRD1/8P
R201	0114064	Carbon film	91Ω	±5%	SRD¼P
R202	0114137	Carbon film	180Ω	±5%	SRD¼P
R204	0137567	Carbon film	470Ω	±5%	SRD¼SD
R205	0100106	Carbon film	51KΩ	±5%	SRD1/8P
R206	0100093	Carbon film	15KΩ	±5%	SRD1/8P
R207	0100047	Carbon film	180Ω	±5%	SRD1/8P
R208	0100063	Carbon film	820Ω	±5%	SRD1/8P
R209	0100085	Carbon film	680Ω	±5%	SRD1/8P
R210	0151187	Control	5KΩ-B		AGC
R211	0114211	Carbon film	27KΩ	±5%	SRD¼P
R212	0100059	Carbon film	560Ω	±5%	SRD1/8P
R213	0100073	Carbon film	2.2KΩ	±5%	SRD1/8P
R214	0114179	Carbon film	5.6KΩ	±5%	SRD¼P
R215	0100089	Carbon film	10KΩ	±5%	SRD1/8P
R216	0100113	Carbon film	47Ω	±5%	SRD1/8P
R217	0100113	Carbon film	47Ω	±5%	SRD1/8P
R218	0100065	Carbon film	1KΩ	±5%	SRD1/8P
R219	0100047	Carbon film	180Ω	±5%	SRD1/8P
R220	0100069	Carbon film	1.5KΩ	±5%	SRD1/8P
R221	0100109	Carbon film	[illegible]Ω	±5%	SRD1/8P
R222	0114205	Carbon film	[illegible]Ω	±5%	SRD¼P
R223	0151187	Control	5KΩ-B		
R224	0100089	Carbon film	10KΩ	±5%	SRD1/8P
R241	0114149	Carbon film	560Ω	±5%	SRD¼P
R242	0114201	Carbon film	10KΩ	±5%	SRD¼P
R244	0114161	Carbon film	1KΩ	±5%	SRD¼P

SYMBOL NO.	PARTS NO.	DESCRIPTION			
R261	0100091	Carbon film	12KΩ	±5%	SRD1/8P
R262	0100089	Carbon film	10KΩ	±5%	SRD1/8P
R263	0100053	Carbon film	330Ω	±5%	SRD1/8P
R264	0114177	Carbon film	4.7KΩ	±5%	SRD¼P
R265	0100105	Carbon film	47KΩ	±5%	SRD1/8P
R301	0100071	Carbon film	1.8KΩ	±5%	SRD1/8P
R302	0100071	Carbon film	1.8KΩ	±5%	SRD1/8P
R303	0100073	Carbon film	2.2KΩ	±5%	SRD1/8P
R304	0114171	Carbon film	2.7KΩ	±5%	SRD¼P
R305	0114147	Carbon film	47Ω	±5%	SRD¼P
R306	0159622	Control	10KΩ-B		CONTRAST
R307	0114175	Carbon film	3.9KΩ	±5%	SRD¼P
R308	0114177	Carbon film	4.7KΩ	±5%	SRD¼P
R309	0114177	Carbon film	4.7KΩ	±5%	SRD¼P
R310	0151640	Control	5KΩ-B		SUB. BRIGHT
R311	0159510	Control	200Ω-B		BRIGHT
R312	0114181	Carbon film	6.8KΩ	±5%	SRD¼P
R313	0114171	Carbon film	2.7KΩ	±5%	SRD¼P
R314	0114211	Carbon film	27KΩ	±5%	SRD¼P
R316	0114213	Carbon film	33KΩ	±5%	SRD¼P
R317	0100057	Carbon film	470Ω	±5%	SRD1/8P
R318	0114139	Carbon film	220Ω	±5%	SRD¼P
R319	0114149	Carbon film	560Ω	±5%	SRD¼P
R401	0114169	Carbon film	2.2KΩ	±5%	SRD¼P
R402	0114041	Carbon film	10Ω	±5%	SRD¼P
R403	0114209	Carbon film	22KΩ	±5%	SRD¼P
R404	0114203	Carbon film	12KΩ	±5%	SRD¼P
R405	0114143	Carbon film	330Ω	±5%	SRD¼P
R406	0114131	Carbon film	100Ω	±5%	SRD¼P
R407	0100057	Carbon film	470Ω	±5%	SRD1/8P
R408	0114203	Carbon film	12KΩ	±5%	SRD¼P
R410	0137655	Carbon film	15KΩ	±5%	SRD½SD
⚠ R411	0119507	Metal oxide film	10Ω	±5%	RN¼
R414	0137563	Carbon film	330Ω	±5%	SRD½SD
R415	0114179	Carbon film	5.6KΩ	±5%	SRD¼P
R416	0137651	Carbon film	10KΩ	±5%	SRD½SD
R417	0137563	Carbon film	330Ω	±5%	SRD½SD
R418	0137569	Carbon film	560Ω	±5%	SRD½SD
R419	0137569	Carbon film	560Ω	±5%	SRD½SD
R420	0137701	Carbon film	100KΩ	±5%	SRD½SD
R421	0137661	Carbon film	27KΩ	±5%	SRD½SD
R422	0137525	Carbon film	16Ω	±5%	SRD½SD
R423	0137501	Carbon film	2.2Ω	±5%	SRD½SD
R424	0137501	Carbon film	2.2Ω	±5%	SRD½SD
R428	0114177	Carbon film	4.7KΩ	±5%	SRD¼P
R430	0137551	Carbon film	100Ω	±5%	SRD½SD
R451	0113725	Carbon film	100Ω	±5%	SRD½P
R459	0166691	Control	10KΩ-A		VOLUME
R501	0114151	Carbon film	680Ω	±5%	SRD¼P
R502	0114207	Carbon film	18KΩ	±5%	SRD¼P
R504	0159622	Control	10KΩ-B		COLOR
R505	0159622	Control	10KΩ-B		TINT
R506	0114295	Carbon film	390Ω	±5%	SRD¼P
R507	0114161	Carbon film	1KΩ	±5%	SRD¼P
R508	0114177	Carbon film	4.7KΩ	±5%	SRD¼P
R509	0114169	Carbon film	2.2KΩ	±5%	SRD¼P
R510	0114147	Carbon film	470Ω	±5%	SRD¼P
R511	0114147	Carbon film	470Ω	±5%	SRD¼P
R512	0114147	Carbon film	470Ω	±5%	SRD¼P
R513	0114149	Carbon film	560Ω	±5%	SRD¼P

SYMBOL NO.	PARTS NO.	DESCRIPTION			
R514	0114149	Carbon film	560Ω	±5%	SRD¼P
R515	0114149	Carbon film	560Ω	±5%	SRD¼P
R516	0151264	Control	10KΩ-B		COLOR SYNC.
R517	0114201	Carbon film	10KΩ	±5%	SRD¼P
R518	0114289	Carbon film	220KΩ	±5%	SRD¼P
R520	0114167	Carbon film	1.8KΩ	±5%	SRD¼P
R521	0114167	Carbon film	1.8KΩ	±5%	SRD¼P
R522	0114167	Carbon film	1.8KΩ	±5%	SRD¼P
R601	0114201	Carbon film	10KΩ	±5%	SRD¼P
R602	0159568	Control	5KΩ-B		V. HOLD
R603	0114175	Carbon film	3.9KΩ	±5%	SRD¼P
R604	0114181	Carbon film	6.8KΩ	±5%	SRD¼P
R605	0113727	Carbon film	120Ω	±5%	SRD½P
R606	0114203	Carbon film	12KΩ	±5%	SRD¼P
R607	0114209	Carbon film	22KΩ	±5%	SRD¼P
R608	0114179	Carbon film	5.6KΩ	±5%	SRD¼P
R609	0114211	Carbon film	27KΩ	±5%	SRD¼P
R610	0114151	Carbon film	680Ω	±5%	SRD¼P
R611	0151186	Control	500Ω-B		V. SIZE
R612	0114141	Carbon film	270Ω	±5%	SRD¼P
R613	0114053	Carbon film	33Ω	±5%	SRD¼P
R614	0114141	Carbon film	270Ω	±5%	SRD¼P
R615	0114141	Carbon film	270Ω	±5%	SRD¼P
R617	0119504	Metal oxide film	0.5Ω	±5%	RN¼
R618	0119504	Metal oxide film	0.5Ω	±5%	RN¼
R619	0114151	Carbon film	680Ω	±5%	SRD¼P
R620	0114151	Carbon film	680Ω	±5%	SRD¼P
R621	0114135	Carbon film	150Ω	±5%	SRD¼P
R622	0114181	Carbon film	6.8KΩ	±5%	SRD¼P
⚠ R623	0114002	Carbon film	2.4Ω	±5%	SRD¼P
R624	0114181	Carbon film	6.8KΩ	±5%	SRD¼P
R625	0114173	Carbon film	3.3KΩ	±5%	SRD¼P
R626	0151328	Control	10KΩ-B		V. BIAS
R627	0137563	Carbon film	330Ω	±5%	SRD½SD
R701	0114137	Carbon film	180Ω	±5%	SRD¼P
R703	0114181	Carbon film	6.8KΩ	±5%	SRD¼P
⚠ R704	0151640	Control	5KΩ-B		H. HOLD
R705	0114221	Carbon film	68KΩ	±5%	SRD¼P
R706	0114177	Carbon film	4.7KΩ	±5%	SRD¼P
R707	0114175	Carbon film	3.9KΩ	±5%	SRD¼P
R708	0114201	Carbon film	10KΩ	±5%	SRD¼P
R711	0114143	Carbon film	330Ω	±5%	SRD¼P
R714	0114145	Carbon film	390Ω	±5%	SRD¼P
R715	0113715	Carbon film	39Ω	±5%	SRD½P
⚠ R716	0119503	Metal oxide film	2.2Ω	±5%	RN¼
R717	0114213	Carbon film	33KΩ	±5%	SRD¼P
⚠ R718	0119508	Metal oxide film	56Ω	±5%	RN¼
⚠ R719	0119503	Metal oxide film	2.2Ω	±5%	RN¼
R720	0179556	Metallized glaze	560Ω	±5%	¼PCL
R722	0114201	Carbon film	10KΩ	±5%	SRD¼P
⚠ R723	0114287	Carbon film	180KΩ	±5%	SRD¼P
R725	0137673	Carbon film	82KΩ	±5%	SRD½SD
⚠ R901	0141065	Wire wound	10Ω	±5%	SRD¼P
R902	0114137	Carbon film	180Ω	±5%	SRD¼P
R903	0137573	Carbon film	820Ω	±5%	SRD½SD
R904	0137663	Carbon film	33KΩ	±5%	SRD½SD
R905	0137601	Carbon film	1KΩ	±5%	SRD½SD
R906	0137601	Carbon film	1KΩ	±5%	SRD½SD
R907	0139015	Composition	1MΩ	±10%	RC½GF

PRODUCT SAFETY NOTE: Components marked with a ⚠ have special characteristics important to safety. Before replacing any of these components, read carefully, the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

SYMBOL NO.	PARTS NO.	DESCRIPTION	
SEMICONDUCTORS			
IC001	2360851	MSM4011	
IC002	2360721	MSM4001	
IC003	2360851	MSM4011	
IC004	2360851	MSM4011	
IC201	2360782	HA11215A	
IC401	2360611	HA11229	
IC501	2361281	μPC1352C	
IC601	2360691	HA11235	
Q001	2321541	Silicon	2SC1740 Ⓠ/Ⓡ
Q002	2321321	Silicon	2SA844 Ⓓ/Ⓔ
Q003	0573480	Silicon	2SC458 Ⓑ
Q241	2320631	Silicon	2SA673 Ⓑ/Ⓒ
Q261	0573480	Silicon	2SC458 Ⓑ
Q301	0573480	Silicon	2SC458 Ⓑ
Q302	2320631	Silicon	2SA673 Ⓑ/Ⓒ
Q401	2320644	Silicon	2SC1213 Ⓓ
Q402	2320637	Silicon	2SA673 Ⓒ/Ⓓ
Q403	0573480	Silicon	2SC458 Ⓑ
Q404	0573480	Silicon	2SC458 Ⓑ
Q405	0573480	Silicon	2SC458 Ⓑ
Q601	0573480	Silicon	2SC458 Ⓑ
Q602	2320843	Silicon	2SC1162WT Ⓒ
Q603	2320855	Silicon	2SA715 WT Ⓑ/Ⓒ
Q701	2320663	Silicon	2SC1213AC
⚠ Q702	2321581	Silicon	2SC1055U
⚠ Q901	2321766	Silicon	2SB566-04
⚠ Q902	0573480	Silicon	2SC458 Ⓑ
⚠ Q903	2320631	Silicon	2SA673 Ⓑ/Ⓒ
D001	2330351	Silicon	1S2076
D002	2330351	Silicon	1S2076
D003	2330351	Silicon	1S2076
D004	2330351	Silicon	1S2076
D005	2330351	Silicon	1S2076
D006	2330351	Silicon	1S2076
D007	2330351	Silicon	1S2076
D008	2330351	Silicon	1S2076
D009	2330351	Silicon	1S2076
D010	2330351	Silicon	1S2076
D011	2330351	Silicon	1S2076
D012	2330351	Silicon	1S2076
D013	2330351	Silicon	1S2076
D014	2330351	Silicon	1S2076
D015	2330351	Silicon	1S2076
D016	2330351	Silicon	1S2076
D017	2330351	Silicon	1S2076
D018	2330351	Silicon	1S2076
D019	2330351	Silicon	1S2076
D301	2330351	Silicon	1S2076
D401	2340332	Silicon	MV-11
D501	2330351	Silicon	1S2076
D502	2330351	Silicon	1S2076
D503	2330351	Silicon	1S2076
D601	2340332	Silicon	MV-11
D602	2330351	Silicon	1S2076
D702	2330551	Silivon	V09C
D703	2330251	Silicon	V09C
D704	2330562	Silicon	V11L
D705	2330551	Silicon	V09C
⚠ D901	2330256	Silicon	V06CS
⚠ D902	2330256	Silicon	V06CS
⚠ D903	2330256	Silicon	V06CS
⚠ D904	2330256	Silicon	V06CS
D905	2330351	Silicon	1S2076
ZD001	2331084	Silicon	μPC-574J (AG)
ZD002	2330741	Silicon	HZ-9 Ⓐ
ZD003	2331152	Silicon	HZ-12 Ⓑ
ZD401	2331154	Silicon	HZ-12
ZD901	2331818	Silicon	HZ-7 Ⓒ-2

SYMBOL NO.	PARTS NO.	DESCRIPTION
COILS		
L002	2120482	Filter coil
L003	2120482	Filter coil
L004	2120482	Filter coil
L051	2120333	Filter coil
L201	2122162	Filter coil
L202	2161845	Filter coil
L203	2161845	Filter coil
L205	2120079	Peaking coil
L206	2142015	Mold IF
L207	2142015	Mold IF
L208	2121693	Peaking coil
L209	2120483	Filter coil
L210	2120482	Filter coil
L401	2120122	Peaking coil
L402	2121698	Peaking coil
L501	2160831	Settle coil
L502	2121698	Peaking coil
L701	2121182	Filter coil
L702	2120811	Filter coil
L703	2120333	Filter coil
L704	2270592	Filter coil
TRANSFORMERS		
T501	2141535	BP Transformer
T701	2260013	H. Drive transformer
⚠ T702	2431913	Flyback transformer
⚠ T901	2212371	Power transformer
MISCELLANEOUS		
	2750292	Antenna-Telescopic antenna
	2760521	Antenna-Loop antenna
	3327001	Block-Auto search block
	2811211	Board-Sound/Power P.W. Board
	2811231	Board-GTX TV P.W. Board
	2687781	Board-Antenna terminal
	3452581	Cover-Lower cover
	3452921	Cover-Upper cover
	3756622	Cover-Battery cover
⚠	2742514	Cord-AC cord
⚠	2742597	Cord-DC cord

SYMBOL NO.	PARTS NO.	DESCRIPTION
CP202	2161503	Complex tray
CP402	2141992	Compound component
MF201	2142241	Ceramic filter
MF401	2140631	Compound component
DL301	2161951	Delay line
⚠	2441101	Deflection yoke
	2730063	Earphone
	4131741	Fuse holder
⚠	0193021	Focus block
⚠ F901	2720111	Fuse 0.75A
⚠ F902	2720592	Fuse 2A
	2771891	Ferrite core
	3224051	Front frame
CP201	2300071	Filter-SAW filter
	3740832	Holder-Battery holder
⚠ J451	2670751	Jack-Earphone jack
⚠ J901	2664372	Jack-AC/DC jack
	3261722	Knob-Push
	3262101	Knob-Power
	3262111	Knob-Line
	3262121	Knob-Channel up
	3262122	Knob-Channel down
	3262123	Knob-VHF Low
	3262124	Knob-VHF High
	3262125	Knob-UHF
	3262161	Knob
	3262215	Knob-Slide
	3262381	Knob-Manual
⚠ CP701	2370152	Module HM7101HD
⚠ CP901	2370143	Module HM9103
⚠	2370272	Module CPT module
	2661753	Plug
⚠ SP451	2411001	Speaker
S001	2631152	Switch-5P push
S006	2631123	Switch-Push
S007	2631125	Switch-Push
⚠ S901	2631092	Switch-Push-Pull
	4230821	Spring-Battery spring
TH601	2340351	Thermistor 112351-2
	4185501	Terminal-IC support terminal
	4210901	Terminal-Battery terminal
	4220381	Terminal-Battery terminal B
⚠ V1	2351882	Tube-C.P.T 150AYB22
	2423451	Tuner ET-341
X501	2783071	X-tal